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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/084,917
Filing Date: March 01, 2002
Appellant(s): WANG, YANG

Brian Ledell
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 04/27/07 appealing from the Office action mailed 12/29/06.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,687,220	Ayres	2-2004
2002/0198974	Shafer	12-2002
2002/0099849	Alfieri et al.	07-2002

2002/0062344 Ylonen et al. 05-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. Claims 1-5, 16, 17, 19-21, 23 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayres (US 6,687,220) in view of Shafer (US 2002/019874 A1).

Regarding claim 1, Ayres discloses, figs. 1-2, a routing system (20) comprising: a plurality of routing resources (CPU, routing domain, flow rates) and a plurality of virtual routers (VRIs 50 and 52) configured to share selected ones of the routing resources (a single processing unit; a communication interface 40 (DSPs); DRAM). In addition, Ayres discloses a plurality of a software configurable DSPs 42.

Ayres does not expressly disclose resources that are programmably modifiable.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of resources that are programmably modifiable to the routing system of Ayres. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 2, Ayres discloses the routing system wherein the routing resources include logic resources (CPU; a communication interface 40 (DSPs)) and physical resources (ingress data queue; flow rate; routing domain).

Regarding claim 3, Ayres discloses the routing system wherein the logical resources include routing processes (a communication interface 40) and forwarding process (the CPU selectively retrieves packets from the ingress data queues and forwards them).

Regarding claim 4, Ayres discloses wherein the physical resources include control resources (each VRI 50 and 52 have its own routing domain; ingress data queues 48 formed as linked lists in the DRAM 46 (shared)) and data resources (the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted; the system resources of the router 20 can be fairly distributed or restricted and individual user or VRI bandwidth guarantees (column 7, lines 29-59)).

Regarding claim 5, Ayres discloses the routing system wherein the shared selected ones of the routing resources includes routing processes (40), forwarding processes (CPU), control resources (ingress data queues 48 formed as linked lists in the DRAM 46), and data resources (the system resources of the router 20 can be fairly distributed or restricted and individual user or VRI bandwidth guarantees (column 7, lines 29-59))

Regarding claim 16, Ayres discloses a method comprising: allocating a first set of resources as shared resources (a communication interface 40 and a single control function (CPU), DRAM); allocating a second set or resources as non-shared resources (each VRI have its own routing domain; flow manager 54 controls the packets flow rates); and implementing a plurality of virtual routers (VRI 50 and 52) based on a sharing of resources from the first set of resources between the virtual routers (a single control function) and based on independently assigning resources of the second set of resources to the virtual router (the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted; each VRI 50 and 52 have its own routing domain).

Ayres does not disclose that resources are user programmable.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. The router management interface permits various entities, **such as human users and automated scripts, to configure the router**. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of user programmable resources to the routing system of Ayres. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 17, Ayres discloses the method wherein the first and second sets of resources are implemented by a single physical router system (see fig. 1, router 20).

Regarding claim 19, Ayres discloses the method wherein the resources of the fist and second set of resources include logic resources (a communication interface 40 and a single control function (CPU)) and physical resources (each VRI have its own routing domain; flow manager 54 controls the packets flow rates).

Regarding claim 20, Ayres discloses the method wherein the logic resources include routing processes (a communication interface 40, comprising a plurality of a software configurable DSPs 42 that processes (demodulates) upstream packets) and forwarding process (CPU selectively retrieves packets from the ingress data queues and forwards the retrieved packets to output queues).

Regarding claim 21, Ayres discloses the method wherein the physical resources include control resources (each VRI have its own routing domain) and data resources (flow manager 54 controls the packets flow rates).

Regarding claim 23, Ayres discloses a routing system comprising: means for performing routing processes (communication interface 40); means for performing forwarding process (CPU 44); means for implementing control resources (CPU 44); means for implementing data resources (Flow Mgr 54); and means for running a plurality of virtual routers (VRI 50 and 52)

that share selected ones of the means for performing routing processes, the means for implementing control resources and the means for implementing data resources (router 20; column 4, lines 28-40).

Ayres does not expressly disclose that resources are user programmable.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. The router management interface permits various entities, such as **human users and automated scripts, to configure the router**. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of user programmable resources to the routing system of Ayres. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 27, Ayres discloses the routing system wherein the means for implementing data resources includes means for implementing a port bandwidth of the routing system (the respective packet flow rates of the ingress data queues associated with each VRI are independently adjusted).

2. Claims 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alfieri et al. (US 2002/0099849) in view of Shafer (US 2002/019874 A1).

Regarding claim 8, Alfieri discloses a network point-of-presence comprising: a physical router (14) system having a plurality of resources (routers; routing tables; communication links; memory; a mapping table; OSPF (*that is used to calculate routes by the number of routers, transmission speed, delays and route cost*); BGP (*BGP is a Gateway Protocol which routers employ in order to exchange appropriate levels of routing information*) etc.); at least one backbone router (VBR 22) implemented as a virtual router by the physical router system (14); and at least one regional router (VAR 20) implemented as a virtual router by the physical router system (14), wherein the backbone virtual router (22) and the regional virtual router (20) share resources of the physical router system (see figs. 2-5; 0033-0036).

Alfieri does not expressly disclose resources that modifiable by a user.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. The router management interface permits various entities, such as **human users and automated scripts, to configure the router**. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of a programmable resource to the routing system of Alfieri. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 9, Alfieri discloses the network POP further comprising: ports connecting the backbone virtual router to a high capacity transit network (fig. 2, backbone links 18); and ports connecting the regional router to a metropolitan area network (links 16).

Regarding claim 10, Alfieri discloses the network POP wherein the physical router is a single physical router (router 14).

Regarding claim 11, Alfieri discloses the network POP wherein the plurality of resources includes logic resources (0032, 0037) and physical resources (routing tables, communication links).

Regarding claim 12, Alfieri discloses the network POP wherein the logic resources include routing processes (0037) and forwarding processes (0032).

Regarding claim 13, Alfieri discloses the network POP wherein the physical resources include control resources (each VAR 20 has its own routing table; the VBR 22 maintains a full BGP routing table (0023-0024, 0036)) and data resources (see fig. 4 and 5).

Regarding claim 14, Alfieri discloses the network POP wherein the control resources include at least one routing table (each VAR 20 has its own routing table; the VBR 22 maintains a full BGP routing table (0023-0024, 0036) and the data resources include transmission bandwidth of at least one port of the routing system (as shown in fig. 4, a number of physical

interfaces 50 connect to the access links 16 and 18 (ports). Examples of such interfaces include Ethernet interfaces, SONET interfaces etc.).

3. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ylonen et al. (US 2002/0062344) in view of Shafer (US 2002/019874 A1).

Regarding claim 1, Ylonen discloses, in Fig. 1b, a plurality of virtual routers 110-112 (claimed a plurality of virtual routers) that use the **same hardware**, (i.e. the physical input lines and output lines) and **same processor** 116 (claimed a plurality of routing resources). The virtual routers are separate entities and suitable multiple access scheme is applied to **share the common physical resources** between them (0004).

Ylonen fails to disclose resources that are programmably modifiable.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of resources that are programmably modifiable to the routing system of Ylonen. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 2, Ylonen discloses the routing system wherein the routing resources include logic resources (processor) and physical resource (same physical input lines 114, output lines 115).

4. Claims 6, 22, 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayres in view of Shafer as applied to claims 1 and 23 above, and further in view of Alfieri.

Ayres in view of Shafer discloses all the claim limitations as stated above. Ayres, further, discloses that the router 20 includes **a shared buffer memory 46** and each VRI 50 and 52 have its **own routing domain** (as in claim 26). However, Ayres does not expressly disclose the control resources include at least one routing table.

Alfieri teaches several virtual access routers 20 and virtual backbone router 22 that are associated with respective customers. Each VAR 20 has its own routing table and runs its own instances of the routing protocol. The VBR 22 generally maintains a full BGP routing table. Further, Alfieri teaches that wide-area network 10 may employ routing protocols such as BGP, OSPF, RIP, etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add routing table, such as suggested by Alfieri, to the VRI of Ayres in view of Shafer in order to provide an efficient and reliable communication system.

(10) Response to Argument

Appellant argues (on pages 5-6 of the Brief) that *neither Ayres nor Shafer disclose or suggest virtual router that share routing resources in accordance with a programmable modifiable resource sharing configuration, as recited in claim 1*. Examiner respectfully

disagrees. Ayres clearly discloses that virtual routers share resources (such as: CPU, shared memory, single control function). Shafer teaches a software modules running on a network **router**. A router management interface provides access to **software modules and other resources residing on the router**. In particular the router management interface permits various entities such as **automated scripts** to configure the router and obtain operational information. Using the router management interface, the entities can make changes to the present router **configuration and more efficiently manage router resources, policies and relation ships with other routers** (page 1, 0004). The Examiner also notes that the Appellant **only** claims plurality virtual routers configured to share the routing resources but does not go into details how resources are allocated to the virtual routers. The instant specification also does not go into details how the resources are allocated in accordance with a programmably modifiable resource-sharing configuration.

On page 8 of the Brief, Appellant argues "*none of the router management operations described by Shafer* ***relate to the configuration of virtual routers to share routing resources*** *in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1.*" It is respectfully submitted that the rejection is based the combined teaching of Ayres patent and the Shafer patent. As stated above (and as acknowledged by Appellant on page 7, line 15) that Ayres discloses a plurality of virtual routers that share a plurality of routing resources.

Regarding claim 5, Appellant argues (pages 8-9) that "*although Ayres generally discusses virtual router, Ayres does not appear to be particularly concerned with how resources are allocated to the virtual routers, much less that the shared routing resources include the particular resources recited in claim 5*". Examiner respectfully disagrees with Appellant

assertion. Appellant **only** claims type of resources but does not go into details how resources are allocated to the virtual routers. Ayres discloses routing resources include:

routing processes (a communication interface 40, comprising a plurality of software configurable DSPs 42); in a typical packet data router, packets originating from various source locations are received via a plurality of communication interfaces. Each packet contains routing information, such as a destination address which is associated with a respective communication interface of the router, e.g., by a routing table or packet forwarding protocol; column 1, lines 26-31);

forwarding process (the router 20 receives data packets from a plurality of different end users and based routing information such as destination address forwards the packet to the appropriate destination; column 4, lines 30-35; CPU 44 selectively retrieves packets from queues 48 and forwards to output queues associated with the respective output destinations, or otherwise drops packets that are non-deliverable; column 5, lines 40-51);

control resources (queues 48; furthermore, it is inherent to use routing table and packet forwarding protocol in order to forwards packet to the appropriate destination); and

data resource (the system resources of the router 20 can be fairly distributed or restricted and individual user or VRI bandwidth guarantees... (See column 7, lines 29-59)).

Still on page 9, Appellant argues, "*a CPU and a communication interface do not disclose or suggest the routing processes and forwarding processes recited in claim 5. As consistently used and defined by the specification, the routing processes and forwarding processes refers to logical resources of the router.*" Examiner acknowledges that Ayres does not describe a method identical to that disclosed by Appellant's. However, claims are to be given

their broadest reasonable interpretation during prosecution, and the scope of a claim cannot be narrowed by reading disclosed limitations into the claim. See in Morris, 127 F.3d 1048, 1054, 44 USPQ2D 1023, 1027 (Fed.Cir. 1997); in re Zletz, 893 F.2d 319, 321, 13 USPQ2D 1320, 1322 (Fed. Cir, 1998); in re Prater, 415 F.2d 1393, 1404, 162 USPQ 541, 550 (CCPA 1969). In addition, the law of anticipation does not require that a reference "teach" what an appellant's disclosure teaches. Assuming that reference is properly "prior art," it is only necessary that the claims "read on" something disclosed in the reference, i.e., all limitations of the claim are found in the reference, or "fully met' by it. Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983). Furthermore, the CPU 44, disclosed by Ayres, (which is shared by the plurality of routers) selectively retrieves packets from each respective ingress data queue and **forwards** them to output queues. This shows that the CPU implements the method of forwarding processes. The interface 40 determines routing information for received packets.

Regarding claim 16 (pages 9-10 of the Brief), Appellant argues that *"Ayres does not discloses or suggest allocating a first set of resources as shared resources and allocating a second set of resources as non-shared resources..."* Examiner respectfully disagrees with Appellant assertion. Ayres discloses a plurality of virtual routers (50, 52, as shown in fig. 2) that share resources (a single central processing unit 44, shared buffer memory 46, a single control function, and a single interface 40 (allocating a first set of resources as shared resources). Each VRI have its own routing domain; the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted (allocating a second set of resources as non-shared resources).

Still on page 10, Appellant argues that *"Ayres does not discloses or suggest implementing a plurality of virtual routers based on a sharing or resources form the first set of resources between the virtual routers and based on independently assigning resources of the second set of resources to each of the virtual router"*. As stated above, Ayres clearly discloses plurality of routers share a single CPU, memory 46, a single control function, a single interface 40 that comprises a plurality of a software configurable DSPs. Furthermore, each virtual routers has its own routing domain, ingress data queues.

On pages 10-11, Appellant argues that *adjusting an input rate for a virtual router is not equivalent to implementing a plurality of virtual routers based on sharing resources, as recited in claim 16*. Examiner respectfully disagrees with Appellant assertion. As pointed out above, the CPU, the shared memory 46, the single control function, and the single interface 40 are example of sharing resources.

On page 11, Appellant argues that *Shafer cannot possibly suggest resources (which are shared and used to implement virtual routers) that are user programmable*. It is respectfully submitted that this argument is the same as the argument presented above. Therefore, the Examiner takes the same position as discussed for claim 1.

Referring to the argument on page 12, about the laminations in claim 20, these arguments are similar to the arguments presented above; the Examiner takes the same position as discussed for claim 1.

Referring to the argument on pages 13-14, about the laminations in claim 23, these arguments are similar to the arguments presented above; the Examiner takes the same position as discussed for claim 1.

On page 14-15, regarding claim 8, Appellant argues that *Alfieri does not disclose or suggest that the resources that are shared between routers are modifiable by a user, as recited in claim 8. Further, Applicant argues that Shafer does not cure the deficiencies of Alfieri and none of the router management operations described in Shafer relate to modifying resources that are shared between virtual routers as recited in claim 8.* Examiner respectfully disagrees. Alfieri discloses virtual routers that share resources. Alfieri also shows, in fig. 4, a high-level software and hardware organization for a router 14. Further, Alfieri discloses that changes to underlying physical network (includes manual reconfiguration and automatic protection switching) result in the need to change routing tables and other data structures in the routing subsystem. The Examiner believes that Alfieri suggest that resources that are shared between routers are modifiable by a user. Further, Shafer assists by using a router management interface, human users and automated scripts can make changes to the present router **configuration and more efficiently mange router resources, policies and relation ships with other routers** (see 0004). In addition, Shafer teaches that routers maintain tables of routing information and exchange data and share resources.

On page 16 of the Brief, Appellant argues that *although paragraphs 0037 and 0032 of Alfieri discuss "routing protocols" and "forwarding engines" respectively, these sections of Alfieri in no way disclose or suggest that these elements of Alfieri are resources that are shared in the manner recited in claim 12.* Examiner respectfully disagrees with Appellant contention. Alfieri clearly discloses, in Fig. 5, that the tasks 60 are independent processes that are time-shared among the various VRs (see 0036). For example, OSPF 60-0 performs operations in accordance with received packet, which includes **updating the routing table** (routing process)

and initiating the transmission of one or more routing protocol packets to other routers (paragraph 0037, lines 8-13). VARs 20 and VIs 30 share hardware forwarding engines residing on line cards within the router 14 (0032). Further, Shafer assists by using a router management interface, human users and automated scripts can make changes to the present router **configuration and more efficiently mange router resources, policies and relation ships with other routers** (see 0004).

On pages 17-18, Appellant argues that *Ylonen discloses virtual routers, but not virtual routers that share routing resources as recited in claim 1. Shafer discloses a router management interface, but Shafer does not disclose using the router management interface to configure virtual routers to share routing resources in the manner recited in claim* 1. Examiner respectfully disagrees with Appellant assertion. As admitted by the Applicant, Ylonen discloses a number of virtual routers that use the same hardware, such as same processor, same input and output lines. Furthermore, as shown in fig. 6, all virtual router 603a-c share one IPSEC module. Shafer assists by using a router management interface, human users and automated scripts can make changes to the present router **configuration and more efficiently mange router resources, policies and relation ships with other routers** (see 0004).

Referring to the argument on page 19, about the laminations in claims 6, 22 and 24-26, these arguments are similar to the arguments presented above; the Examiner takes the same position as discussed for claims 1, 21 and 23.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

(12) Conclusion

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

ST

August 2, 2007

Conferees:

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SUPERVISORY PATENT EXAMINER

Doris To